(No Model.)

J. R. WHITNEY.

FLASK FOR MOLDING CAR WHEELS.

No. 428,293. Patented May 20, 1890.

Fig. 1.

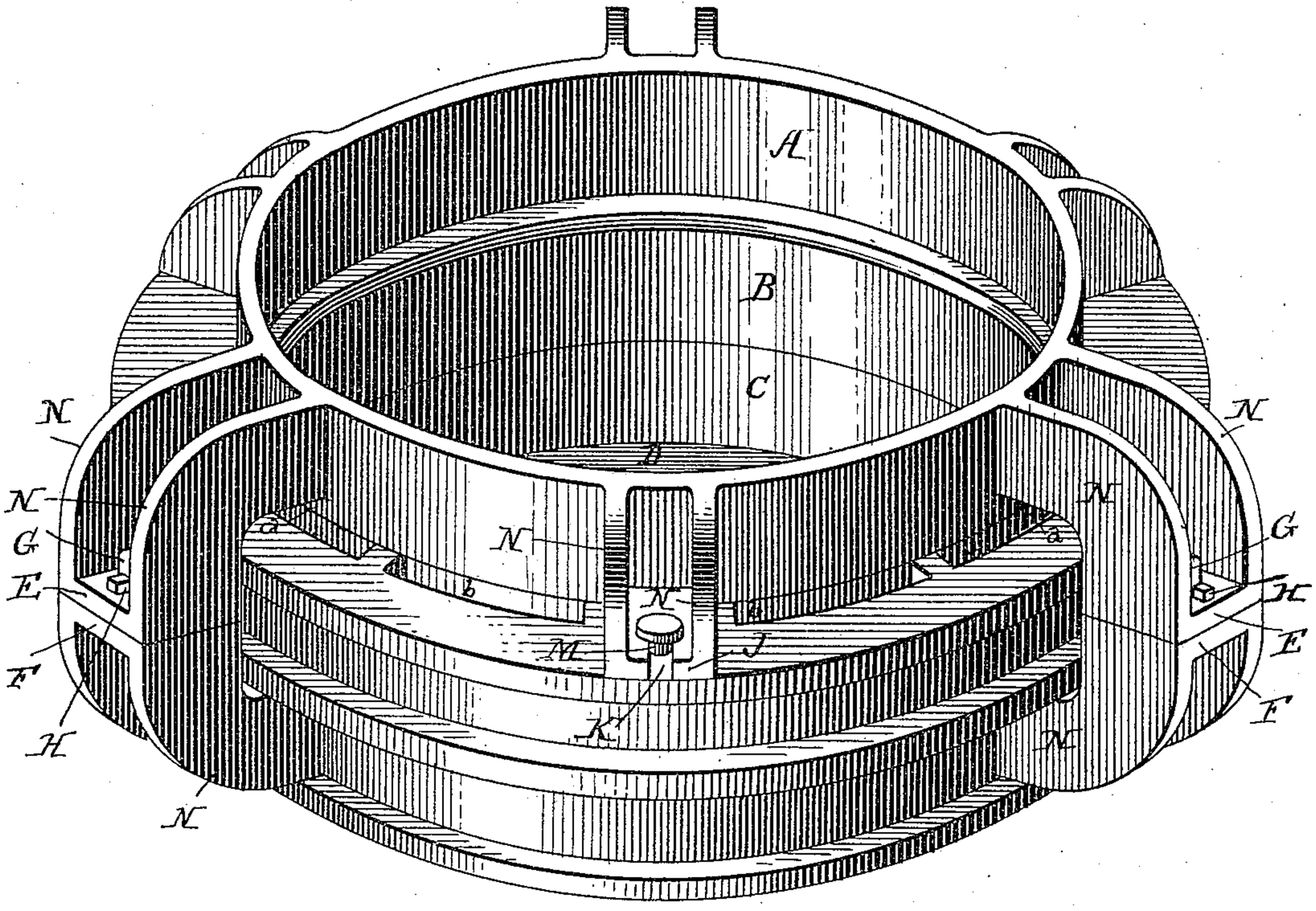


Fig. 2.

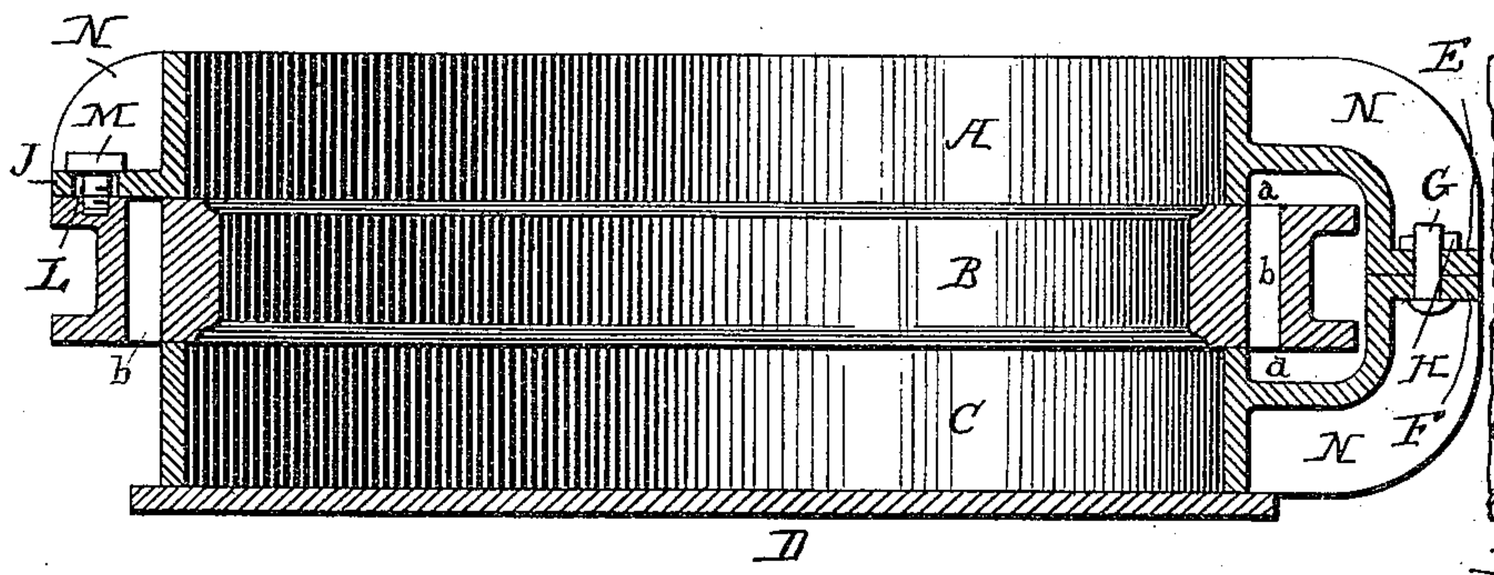
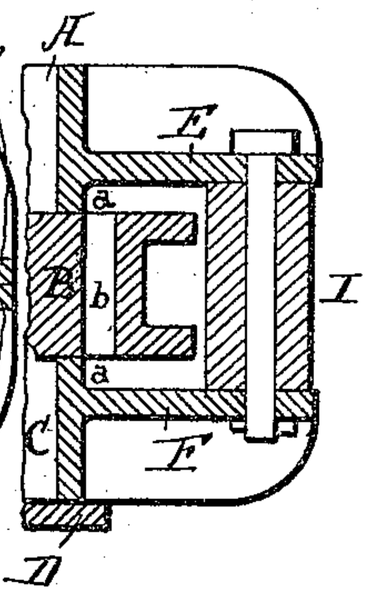


Fig. 3.



Witnesses
Jno. G. Hinkel Jr.
Georgia A. Kramer.

John R. Whitney
Inventor

By his Attorneys
Foster & Freeman

UNITED STATES PATENT OFFICE.

JOHN R. WHITNEY, OF RADNOR, PENNSYLVANIA.

FLASK FOR MOLDING CAR-WHEELS.

SPECIFICATION forming part of Letters Patent No. 428,293, dated May 20, 1890.

Application filed September 10, 1889. Serial No. 323,535. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. WHITNEY, a citizen of the United States, residing at Radnor, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Flasks for Molding Car-Wheels, of which the following is a specification.

My invention relates to flasks for casting chilled articles, and more particularly chilled car-wheels; and it consists in constructing and arranging the several parts of the flask so that while the chill is secured within and really forms a part of the flask, yet when in use it is perfectly free to expand and contract by the heating and cooling which take place in casting the wheel, as will be hereinafter more fully set forth.

Referring to the accompanying drawings, in which the same reference-letters indicate corresponding parts in each of the figures, Figure 1 is a perspective view of my improved flask. Fig. 2 is a vertical sectional view, and Fig. 3 is a broken detail view showing a modification of the arrangement.

The ordinary flask used for casting chilled articles consists of four parts, as shown in the drawings, the cope A, the chill B, the drag C, and the bottom plate D. When the article—as, for instance, a car-wheel—has been molded, these parts are securely clamped together before pouring to keep the mold intact when subjected to the pressure of the molten metal. In the ordinary flask, where the cope and drag are in close contact with the solid chill, if the clamping of the flask together is not done uniformly at all points the chill when heated by the molten metal expands irregularly, owing to the fact that it is clamped more tightly by the cope and drag at some points than it is at others, and of course it will expand most where there is the least resistance. In consequence of this it soon becomes more or less out of round, and the wheels cast in it are not perfectly circular. With the contracting chill the effect of this unequal clamping is seen in a different way. This chill is constructed with an inner and an outer ring connected to each other by arms or webs having open air-spaces between them and having the inner ring or chilling-surface divided into segments. It is called a "contracting chill" because these inner segments when heated by the molten metal expand toward the center of the chill and thus contract its diameter. If the cope and drag, or either of them, are in close contact with the inner ring, it is found that the clamping of the flask together unequally at different points brings such pressure upon some of the segments that their free movement inward is prevented, thus destroying the true circular form of the chill and at the same time producing an uneven chilling effect upon the wheel. To obviate this the cope and drag have been so constructed as to bring the pressure of the clamping upon the outer ring entirely. By this arrangement the inner segments are now free to expand toward the center; but as soon as the heat is transmitted by conduction through the webs to the outer ring it begins to expand outwardly, and if the clamping is not uniform this expansion is not uniform. It is more at some points than at others, and as a consequence this outer ring soon loses its true circular form, carrying with it the inner segments, and so affecting the wheels cast in it. To overcome these difficulties in both the solid and the contracting chill, I have found that it is absolutely necessary to have the chill entirely relieved from the pressure of the cope and drag when the flask is clamped together, so that it shall be perfectly free to expand and contract the same at all points, thus producing a perfectly true wheel at all times and adding to the life of the chill itself. To do this I have constructed the cope and drag each with three or more lugs or brackets E and F, which register with and bear against each other, respectively, when the flask is put together for pouring. Each lug may be provided with a hole, through which passes a bolt or pin G, having a wedge passed through a hole in its end for drawing the corresponding lugs of the cope and drag closely together; or they may be held together by an ordinary bolt and nut, or by an entirely separate clamp, or by any other suitable device. All of the lugs project out beyond the outer edge or rim of the chill, and are so arranged that when their surfaces are in contact the bottom edge of the cope and the top of the drag are just a trifle farther

apart than the thickness of the chill, which will thus prevent any pressure whatever upon the chill. When the contracting chill is used, I prefer to so place these lugs on the cope and drag as to leave a space *a* of half an inch or more between them, and the upper and lower faces of the chill, so as not to close the air-passages *b b* between the segments and prevent the free circulation of air. In this manner it will be seen that while the cope and drag are held together as securely as with the ordinary construction, the chill, which may be either solid or contracting, is free to expand and contract equally and uniformly in all directions.

If it is desired to use the same cope and drag with chills of different thicknesses, it can be easily done by means of blocks or washers I of the desired size, which can be placed between the lugs, as shown in the modified form in Fig. 3, in which the brackets E and F are shown as extending straight out horizontally, instead of being curved vertically at the outer ends, as shown in the other figures, although a corresponding thinner block could be used with the curved brackets. It is evident that both these clamping-lugs on the cope and drag, or either of them, may be straight or bent without affecting the principle involved in the arrangement. As a matter of convenience I prefer to fasten the cope and chill together permanently, but so loosely that the expansion and contraction of the chill are not interfered with in the least. I accomplish this, as is often done, by providing the cope with three or more additional lugs J, preferably alternating with the brackets E. They may be made with a slot K, as seen in Fig. 1, or a large hole L, as shown in Fig. 2. Through this slot or hole passes a short bolt M, having a head which engages with the top of the lug and has its lower end securely fastened to the chill. In this manner the chill is suspended from the cope without being in close contact with it, so that the two are more easily and quickly placed in position on the drag and removed from it than if they were not thus connected together. It is not essential, however, to my device that they should be thus secured to each other, but when they are the attachment should be so made that the free movement of the chill is not interfered with.

The different lugs and brackets described may be cast upon the cope and drag or be formed separately and be bolted in place, and they may be made of cast-iron or any other suitable material, and may be also provided with ribs N N, if desired, to give them additional strength, although I do not limit myself to any particular shape or construction of them, but only to their arrangement, whereby they may be clamped together without any pressure being exerted at any point upon the chill by the cope or drag. If it is desired, these lugs may be enlarged so as to form trunnions by which the flask can be more easily handled and turned over.

The bottom plate D may be secured to the drag by being locked onto it by suitable lugs and sockets, or by the ordinary clamp and bolts, as may be found most convenient.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. In a flask, the combination, with an intermediate chill, of the cope and drag, each provided with lugs adapted to bear against each other, whereby the pressure in clamping is brought upon the lugs without pressure being applied to the chill, substantially as described.

2. In a flask, the combination, with the chill, of a cope and a drag, each provided with lugs extending beyond the outer edge of the chill and adapted to bear against each other, whereby the cope and drag may be clamped together without any pressure being applied to the chill, and clamps for holding said flask together, substantially as described.

3. In a flask, the combination, with the chill, of a cope and drag, each provided with lugs secured thereto, with a space between them and the chill, said lugs extending beyond the outer edge of the chill, and clamps for holding the flask together, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN R. WHITNEY.

Witnesses:
WM. H. R. LUKENS,
CHAS. F. HINCKLE.